Volunteer Lake Assessment Program Individual Lake Reports

GLEN LAKE, GOFFSTOWN, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	129,480	**Max. Depth (m):**	15.8	**Flushing Rate (yr^{-1})**	80
Surface Area (Ac.):	119	**Mean Depth (m):**	5.9	**P Retention Coef:**	0.01
Shore Length (m):	4,700	**Volume (m^3):**	2,826,500	**Elevation (ft):**	271

TROPHIC CLASSIFICATION

Year	Trophic class
1979	EUTROPHIC
1991	MESOTROPHIC

KNOWN EXOTIC SPECIES

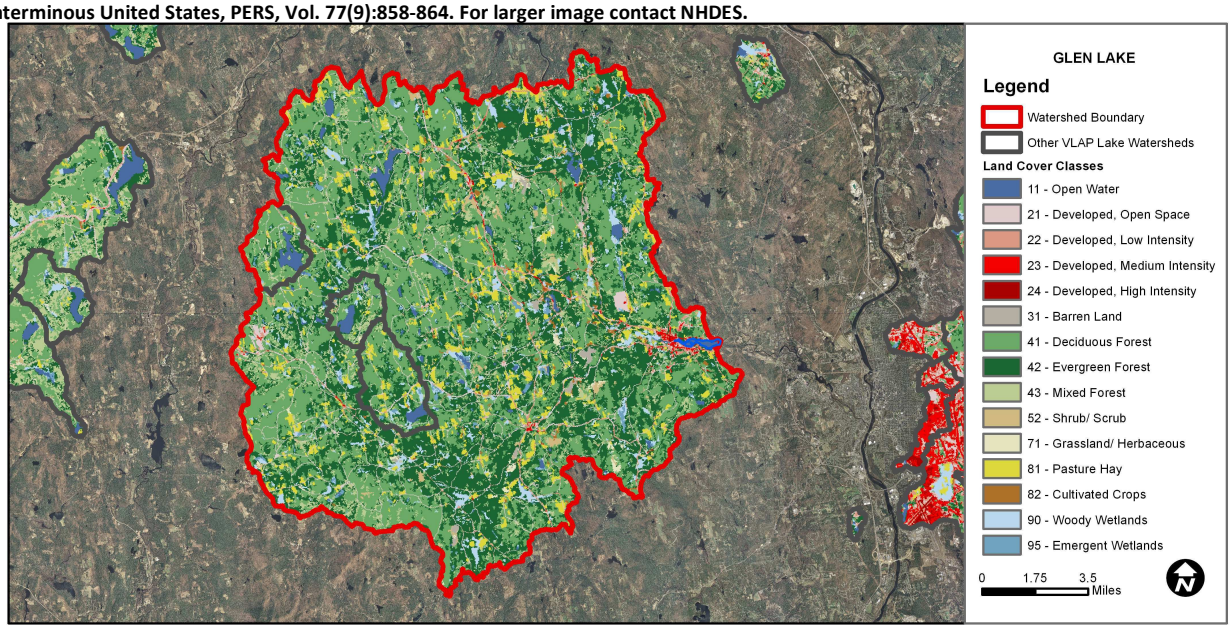
Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	The calculated median is fewer than 5 samples but > indicator and the chlorophyll a indicator is okay. More data needed.
	pH	Cautionary	< 10 samples and 1 exceedance of criteria. More data needed.
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Encouraging	There are no geometric means or there are > 2 single samples but those samples are within 75% of the geometric means criteria. More data needed.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



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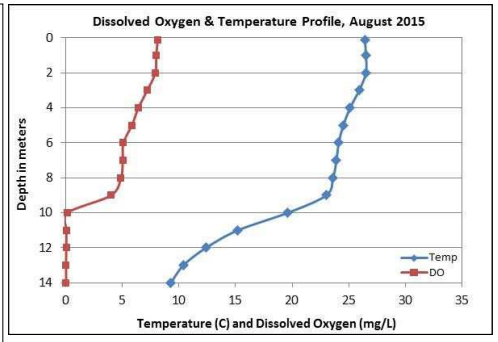
2015 Data Summary

Recommended Actions: Maintain current monitoring program to establish a baseline set of water quality data to assess seasonal and historical water quality trends. Lake phosphorus levels are slightly higher than desirable and could promote excessive algal growth. Keep an eye out for algal blooms or surface scums and report them to DES. The steep slopes along the shoreline highlight the importance of maintaining vegetative buffers to stabilize banks and filter stormwater runoff before entering the lake. UNH's "Landscaping at the Water's Edge" is a great resource. Keep up the great work!

Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were within a low range in July and August. The 2015 average chlorophyll level remained stable with 2014 and was less than the state median. Visual inspection of historical data indicates relatively stable chlorophyll levels since 2013.
- **Conductivity/Chloride:** Deep spot and Inlet conductivity levels were slightly greater than the state medians. Average epilimnetic (upper water layer) conductivity increased slightly from 2014 and visual inspection of historical data indicates epilimnetic conductivity has increased (worsened) since 2007.
- **Total Phosphorus:** Epilimnetic phosphorus was slightly elevated in June but decreased to average levels in August. Average epilimnetic phosphorus decreased from 2014 and was slightly greater than the state median. Visual inspection of historical data indicates relatively stable epilimnetic phosphorus levels. Metalimnetic (middle water layer) phosphorus was elevated in July and the turbidity was also elevated potentially indicating a layer of algae at that depth. Metalimnetic phosphorus decreased to average levels in August. Hypolimnetic (lower water layer) phosphorus was slightly elevated in July and August potentially due to the release of phosphorus from bottom sediments when dissolved oxygen levels are depleted below 1.0 mg/L. Inlet phosphorus levels were average and remained stable from July to August.
- **Transparency:** Transparency (NVS) was good in July but decreased (worsened) in August potentially due to overcast conditions. Average NVS transparency increased (improved) from 2014 but was slightly less than the state median. Visual inspection of historical data indicates transparency has improved. Transparency measured with the viewscope (VS) was generally better than NVS transparency and likely a better representation of actual conditions.
- **Turbidity:** Epilimnetic turbidity was slightly elevated in July but decreased to low level in August. Metalimnetic turbidity was elevated in July and slightly elevated in August potentially due to layers of algae. Hypolimnetic turbidity was elevated in July and August likely due to the accumulation of organic compounds in hypolimnetic waters when dissolved oxygen levels are depleted below 1.0 mg/L
- **pH:** Deep spot pH levels were slightly less than the desirable range 6.5-8.0 units, however Inlet pH was within the desirable range. Visual inspection of historical data indicates variable epilimnetic pH since monitoring began.



Station Name	Table 1. 2015 Average Water Quality Data for GLEN LAKE							
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
					NVS	VS		
Epilimnion	11.8	3.17	102.8	13	2.94	3.75	1.27	6.44
Metalimnion			94.5	19			5.61	6.15
Hypolimnion			105.3	18			10.17	6.32
Inlet			106.7	14			2.22	6.83

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	N/A	Ten consecutive years of data necessary for analysis.	Chlorophyll-a	N/A	Ten consecutive years of data necessary for analysis.
pH (epilimnion)	N/A	Ten consecutive years of data necessary for analysis.	Transparency	N/A	Ten consecutive years of data necessary for analysis.
			Phosphorus (epilimnion)	N/A	Ten consecutive years of data necessary for analysis.